REMARKS

Status of the claims:

With the above amendments, claims 1 and 8 have been canceled, claims 2 and 3 have been amended and claim 9 has been added. Claims 2-7 and 9 are pending and ready for further action on the merits. No new matter has been added by way of the above amendments. Claim 2 has been amended so that it is dependent from new claim 9. Claim 3 has been amended so that it incorporates the subject matter of claim 1 and claim 8. New claim 9 has support at page 13, lines 13-17. Reconsideration is respectfully requested in light of the following remarks.

Rejections under 35 USC §112, second paragraph

Claims 3 and 8 have been rejected under 35 USC §112, second paragraph as allegedly being indefinite for a lack of antecedent basis. Claim 3 is rejected for no antecedent basis for "final annealing" and claim 8 has been rejected for "the percent reduction". Claim 3 has been amended so it no longer contains the term "final annealing". Applicants believe with this amendment that the rejection has been obviated. Claim 8 has been canceled. Thus, the rejection is moot. Withdrawal of the rejections is warranted and respectfully requested.

Rejections under 35 USC §103

Claims 1 and 3-7 have been rejected under 35 USC §103(a) as being unpatentable over JP '232 (Japanese Patent No. 10-110232).

Claims 1 and 4-7 have been rejected under 35 USC §103(a) as being unpatentable over JP '095 (Japanese Patent No. 09-256095).

Claim 2 and 8 have been rejected under 35 USC §103(a) as being unpatentable over JP '054 in view of Komatsubara '948 (US Patent No. 4,718,948).

Claim 2 and 8 have also been rejected under 35 USC §103(a) as being unpatentable over JP '232 in view of Komatsubara '948.

These rejections are traversed for the following reasons.

Present Invention

The present invention as recited in claim 3 relates to an aluminum sheet material for automobiles. The aluminum alloy composition consists of between more than 2.6 wt% and 5 wt% of Si, 0.2 to 0.8 wt% of Mg, 0.2 to 1.5 wt% of Zn, 0.2 to 1.5 wt% of Cu, 0.2 to 1.5 wt% of Fe, and between 0.05 and less than 0.6 wt% of Mn, and one or more members selected from the group consisting of 0.01 to 0.2 wt% of Cr, 0.01 to 0.2 wt% of Ti, 0.01 to 0.2 wt% of Zr, and 0.01 to 0.2 wt% of V, with the balance of aluminum and unavoidable impurities. The aluminum sheet material is obtained by the method comprising;

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These rejections are traversed for the following reasons.

Present Invention

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melting the aluminum alloy;

casting the aluminum alloy;

homogenizing the aluminum alloy;

hot-rolling the aluminum alloy;

cold-rolling the aluminum alloy;

annealing the aluminum alloy; and then

cooling the aluminum alloy at 3°C/sec or above,

thereby obtaining the aluminum sheet material for automobiles. The percent reduction is 98% or above in the production of the aluminum sheet material for automobiles.

Disclosure of JP '054

JP '054 discloses an aluminum alloy composition that is 2.3-3.5 % weight Si, 0.2-0.8 % weight Mg, 0.05-0.5 % weight Zn, less than or equal to 0.3 % weight Cu, less than or equal to 0.3 % weight Fe, and 0.4-0.9 % weight Mn.

JP '054 fails to disclose using higher amounts of Cu and Fe improve the weldability of the alloy composition.

Disclosure of JP '232

JP '232 discloses an Al-Mg-Si alloy that is obtained by subjecting a directly cast and rolled sheet of an Al alloy having a composition containing, as essential elements, by mass, 0.2 to 3.0% Si and 0.2 to 3.0% Mg, one or more of two kinds

among 0.01 to 0.5% Mn, 0.01 to 0.5% Cr, 0.01 to 0.5% Zr and 0.001 to 0.5% Ti, furthermore containing one or two kinds among 0 to 2.5% Cu, 0 to 0.2% Sn and 0 to 2% Zn, in which the content of Fe is regulated to be less than or equal to 1.0%, with the balance being Al with inevitable impurities to cold rolling as well. With this alloy, the maximum grain size in the metallic structure of this sheet is regulated to be less than or equal to 100μm, and the maximum length of continuous Mg_2Si compounds in the surface layer part is regulated to be less than or equal to 50μm.

Disclosure of JP '095

JP '095 discloses a composition of an Al alloy sheet that comprises by weight, as essential components, 0.8 to 3.5% Si, greater than 0.6 to 1.4% Mn, 0.1 to 1.0% Fe and 0.1 to 0.5% Cu, furthermore containing, as needed, one or two of less than or equal 0.6% Mg and less than or equal to 0.2% Zn, with the balance being Al and inevitable impurities. The Al alloy having the above composition is subjected to a final annealing in the temperature range of 350 to 450°C. The time for the final annealing is preferably regulated to be greater than or equal to 30 minutes. Moreover, the cooling rate after the final annealing is preferably regulated to less than or equal to 100°C/hr. The

Al alloy sheet has both characteristics of formability as well as good surface quality.

Disclosure of Komatsubara '948

Komatsubara '948 discloses rolled aluminum alloy sheets with strength and formability. The rolled aluminum alloy sheets are provided to be formed into parts for use in an application where high strength is required after paint baking. The aluminum alloy has a composition consisting essentially of Si 1.2-2.5%, Mg 0.25-0.85%, Fe 0.05-0.4%, Cu 0.1-1.5%, and at least one of Mn 0.05-0.6%, Cr 0.05-0.3%, and Zr 0.05-0.15%, with the balance being essentially aluminum.

Table Illustrating the respective amounts of metals in the alloy composition

The following table is for the Examiner's benefit to show the amounts of metals in the compositions disclosed by the cited references as well as the compositions in the presently claimed invention.

	Claim 3	Claim 2	JP '054	JP '232	JP '095	Kamatsubara '948	Kashiwazaki '870
Si	More than 2.6 to 5.0	More than 2.6 to 5.0	2.3-3.5	0.2-3	0.8-3.5	1.25-2.5	More than 3.5 to 5.0
Mg	0.2-0.8	0.2-0.8	0.4-1	0.2-3	≤0.6	0.25-0.85	0.3-0.8
Zn	0.2-1.5	0.2-1.5	0.05-0.5	0-2.0 (*)	≤2.0		0.4-1.5
Cu	0.2-1.5	0.2-1.5	≤0.3	0-2.5 (*)	0.1-0.5	0.1-1.5	0.4-1.5
Fe	0.2-1.5	0.2-1.5	<0.5	1.0 or less (*)	0.1-1	0.05-0.4	0.4-1.5
Mn	0.05 to less than 0.6	0.05 to less than 0.6	0.4-0.9	0.01-0.5 (*)	More than 0.6-1.4	0.05-0.6 (**)	0.6-1.0
Cr	0.01-0.2 (*)	0.01-0.2 (*)		0.01-0.5 (*)		0.05-0.3 (**)	
Ti	0.01-0.2 (*)	0.01-0.2 (*)		0.001-0.5 (*)			
Zr	0.01-0.2 (*)	0.01-0.2 (*)		0.01-0.5 (*)		0.05-0.15 (**)	
V	0.01-0.2 (*)	0.01-0.2 (*)					
Sn			Essential element 0.1-0.6				
Al	Balance	balance				balance	

off by mag. of 10x

(*) optional component of the composition

(**) must contain at least one of these

Removal of the Rejection over JP '232

Regarding JP '232, Applicants submit that the motivation requisite for an obviousness rejection is lacking as there is no particular suggestion to include the exact elements of the instant invention. In particular, Applicants note that Zn, Cu,

Fe, Mn, Cr, Ti, and Zr are optional in JP '232, whereas Zn, Cu, Fe, and Mn are claimed elements of the instant invention.

Moreover, Applicants believe that JP '232 never teaches or suggests the present invention, because the recited percent reduction in the production of the aluminum sheet material of the present invention is distinct from that disclosed in JP '232.

In the present invention, in order to improve the toughness of the aluminum sheet material, grains in the aluminum alloy are made finer by processing so that the percent reduction is controlled to be 98% or above.

In contrast, the percent reduction is not defined in claim 1 of JP '232. Indeed, a cold-rolling rate (reduction) in claim 3 in JP '232 is defined in a range of from 15% to not more than 70%; or in claim 4, 70% or above. In the EXAMPLES in Table 2 [0025] of JP '232, cold-rolling was conducted with the reduction R(%) 30% or 50%, which are within the range of 15% to 70% of reduction; or 80% reduction for the range of 70% or above. However, JP '232 fails to disclose any specific working example whose reduction amounts are 98% or above. The inventors assume that this is based on the difficulty or impossibility of making the percent reduction to be 98% or above in the direct-casting rolling method disclosed in JP '232. This is because in direct-casting rolling, a casted product is generally designed

to have a thickness of 1.0 mm or less, and cannot be made thicker.

Accordingly, a different grain diameter is attained, which depends on a different percent reduction. While the grain diameter is defined to be 50 μm or less in JP '232, the grain diameter of the present invention is much smaller. The difference in grain diameter that is a result of the difference in the percent reduction gives a difference in toughness of an alloy (see, for example, the Charpy impact value in Table 9 on page 27 of the present specification).

In other words, it is impossible to produce an aluminum alloy at a percent reduction of 98% or above by the direct-casting rolling method disclosed in JP '232. Because, the method disclosed in JP '232 precludes the present reduction claimed in the instant invention, JP '232 cannot render obvious the instant invention. Further, because there is no disclosure or suggestion in JP '232 of the claimed percent reduction claimed in the instant invention, a *prima facie* obviousness rejection has not been made.

Accordingly, the rejection is inapposite. Withdrawal of the rejection is warranted and respectfully requested.

Removal of the Rejection over JP '095

JP '095 discloses an Mn range that is outside of the claimed range of the instant invention. Thus, JP '095 fails to disclose or suggest all of the elements of the instantly claimed invention. Withdrawal of the rejection is warranted and respectfully requested. For this reason alone, the rejection is inapposite.

Moreover, JP '095 also fails to teach or suggest the present invention, because the cooling rate claimed in the present invention is distinct from that disclosed in JP '095.

JP '095 discloses that too rapid a cooling rate is not desirable when subjecting an aluminum alloy to cooling after final annealing. JP '095 further discloses that the cooling rate after the final annealing is "desirably 100°C/hr or less" (see paragraph [0016] in JP '095). In contrast, in the present invention, after final annealing, cooling takes place at a rate of 3°C/second or above. This translates to 10,800°C/hr or above, and this rate is used to carry out so-called quenching. Thus, the cooling rate defined in the present invention is much larger (i.e. by an amount that approaches two orders of magnitude or greater) than that of JP '095. This rapid cooling quenching of the aluminum alloy after final annealing produces an aluminum sheet material having excellent properties.

JP '095 fails to disclose or suggest any of these superior properties and especially that they can be obtained by quenching after annealing.

The object of the invention described in JP '095 is to provide an aluminum alloy material having no defect in external appearance quality. In order to achieve this object, JP '095 describes in paragraph [0016]:

> *The cooling rate after the final annealing is not particularly limited. However, when the cooling rate after the final annealing is too fast, the ratio of a supersaturated solute element in a solid solution becomes large, the change (with the lapse of time due to aging-hardening occurs even after finished as a final product, and irregularities occur in material characteristics among products. Therefore, the cooling rate after, the final annealing is desirably 100 °C/hour or less.*

From this passage, it should be apparent to one of ordinary skill in the art that a fast cooling rate is against the object of the invention of JP '095. Thus, JP '095 teaches away from the present invention.

Moreover, Applicants herein provide attached Comparative experiments that show the differences in the rapid cooling rate of the instant invention versus the slower cooling rate disclosed in JP '095. The instant invention shows superior results.

In particular, the comparison of the results between Samples A_1 and C_1 according to the present invention and Samples A_3 and C_3 for comparison, the present invention exhibits

remarkably superior properties in that the claimed aluminum sheet material for automobiles has unexpectedly superior tensile strength and proof strength, and also good elongation and blending properties. This is seen only when one cools the aluminum alloy at a cooling rate of 3°C/second or above after final annealing.

As described above in detail, the present invention conspicuously differs from the techniques disclosed in JP '095 in both the constituents as well as the results of the invention. Thus, one of ordinary skill in the art would not expect to attain the present invention based on the disclosure in JP '095.

Removal of the Rejection over JP '054 in view of Komatsubara '948

JP '054 also fails to teach or suggest the present invention, because the composition of the alloy and advantageous effects of the present invention are distinct from those disclosed in JP '054.

While Sn is an essential element in JP '054, Sn is not an alloying element in the presently claimed invention. In particular new claim 3 of the present application has been amended so that the transitional phrase for the alloy composition has been changed from "consisting essentially of" to "consisting of". Thus, Sn is not present in the instant

invention. For this reason alone, one would not use the disclosure of JP '054 to render obvious the instant invention.

Further, the cold-rolling rate is defined to be 50% or more in JP '054. However, JP '054 never discloses or suggests a percent reduction during the processing from a casting ingot to a final product to be 98% or above, which is one of the features of the presently claimed invention.

Komatsubara '948 fails to make up the deficiencies of JP '054. Accordingly, one of ordinary skill in the art would not achieve the present invention based on the combined disclosure of JP '054 and Kamatsubara '948.

Komatsubara '948 does not disclose Zn in its composition. The only Zn disclosed in Komatsubara '948 present is in the Comparative Example 17 in Table 1. Thus, one of ordinary skill in the art would not use Zn in the alloy composition by the teachings of Komatsubara '948. Combining JP' 054 with Komatsubara '948 provides a composition comprising Sn and omitting Zn, in contrast to the composition of the claimed invention. Thus, the rejection is inapposite. Withdrawal of the rejection is warranted and respectfully requested.

Removal of the Rejection over JP '232 in view of Komatsubara '948

As argued above, Applicants submit that the motivation requisite for an obviousness rejection is lacking as there is no

particular suggestion in JP '232 to include the exact elements of the instant invention. In particular, Applicants note that Zn, Cu, Fe, Mn, Cr, Ti, and Zr are optional in JP '232, whereas Zn, Cu, Fe, and Mn are claimed elements of the instant invention.

Furthermore, Applicants submit that JP '232 does not teach or suggest the present invention because the recited percent reduction in the production of the aluminum sheet material of the presently claimed invention is distinct from that disclosed in JP '232.

In the present invention, in order to improve the toughness of the aluminum sheet material, grains in the aluminum alloy are made finer by processing so that the percent reduction is controlled to be 98% or above. This element is claimed in claim 3.

In contrast, the percent reduction is not defined in claim 1 of JP '232. Indeed, a cold-rolling rate (reduction) in claim 3 in JP '232 is defined in a range of from 15% to not more than 70%; or in claim 4, 70% or above. In the EXAMPLES in Table 2 [0025] of JP '232, cold-rolling was conducted with the reduction R(%) 30% or 50%, which are within the range of 15% to 70% of reduction; or 80% reduction for the range of 70% or above. Moreover, JP '232 fails to disclose any specific working example whose reduction amounts are 98% or above. The inventors believe

that this is based on the difficulty or impossibility of making the percent reduction to be 98% or above in the direct-casting rolling method disclosed in JP '232. This is because in direct-casting rolling, a casted product is generally designed to have a thickness of 1.0 mm or less, and cannot be made thicker.

Accordingly, a different grain diameter is attained, which depends on a different percent reduction. While the grain diameter is defined to be 50 μm or less in JP '232, the grain diameter of the present invention is much smaller. The difference in grain diameter that is a result of the difference in the percent reduction gives a difference in toughness of an alloy (see, for example, the Charpy impact value in Table 9 on page 27 of the present specification).

In other words, it is impossible to produce an aluminum alloy at a percent reduction of 98% or above by the direct-casting rolling method disclosed in JP '232. Because, the method disclosed in JP '232 precludes the present reduction claimed in the instant invention, JP '233 cannot render obvious the instant invention. Further, because there is no disclosure or suggestion in JP '232 of the claimed percent reduction in the instant invention, a *prima facie* obviousness rejection has not been made.

Komatsubara '948 does not make up this deficiency. Komatsubara '948 also fails to disclose a percent reduction of 98% or more. Thus, all of the elements of the instantly claimed invention have not been met. A *prima facie* case has not been made. Withdrawal of the rejection is warranted and respectfully requested.

Double Patenting

Claims 1-8 are rejected under obviousness double patenting as being unpatentable over claims 1-17 of Kashiwazaki '870 (US Patent No. 6,325,870).

Please find a terminal disclaimer attached to this reply that disclaims the terminal portion of any patent that may issue from the instant application. Applicants believe that this terminal disclaimer obviates the instant invention. Withdrawal of the rejection is warranted and respectfully requested.

Conclusion

With the above remarks and amendments, it is believed that the claims, as they now stand, define patentable subject matter such that a passage of the instant invention to allowance is warranted. A Notice to that effect is earnestly solicited.

Pursuant to 37 C.F.R. §§ 1.17 and 1.136(a), Applicant(s) respectfully petition(s) for a one (1) month extension of time

for filing a reply in connection with the present application, and the required fee of $110.00 is attached hereto.

If any questions remain regarding the above matters, please contact Applicant's representative, T. Benjamin Schroeder (Reg. No. 50,990), in the Washington metropolitan area at the phone number listed below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By _____ #36,623

Marc S. Weiner, #32,181

MSW/TBS/crt

P.O. Box 747
Falls Church, VA 22040-0747
(703) 205-8000

Attachments

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claims 1 and 8 have been canceled.

The claims have been amended as follows:

2. (Amended) The [A] method of [producing an] claim 9, wherein the aluminum sheet material for automobiles [which] comprises:

[providing an aluminum casting ingot] an aluminum alloy composition which consists essentially of between more than 2.6 wt% and 5 wt% of Si, 0.2 to 0.8 wt% of Mg, 0.2 to 1.5 wt% of Zn, 0.2 to 1.5 wt% of Cu, 0.2 to 1.5 wt% of Fe, and between 0.05 and less than 0.6 wt% of Mn, and one or more members selected from the group consisting of 0.01 to 0.2 wt% of Cr, 0.01 to 0.2 wt% of Ti, 0.01 to 0.2 wt% of Zr, and 0.01 to 0.2 wt% of V, with the balance of aluminum and unavoidable impurities,

[melting the aluminum ingot;

casting the aluminum ingot;

homogenizing the aluminum ingot;

hot-rolling the aluminum ingot; and

cold-rolling the aluminum ingot,]

wherein the [said] aluminum alloy [casting ingot] comprises automobile aluminum parts scraps as at least a part of raw materials for the aluminum alloy.

3. (Amended) An [The] aluminum sheet material [of claim 1] for automobiles, which has an aluminum alloy composition consisting of between more than 2.6 wt% and 5 wt% of Si, 0.2 to 0.8 wt% of Mg, 0.2 to 1.5 wt% of Zn, 0.2 to 1.5 wt% of Cu, 0.2 to 1.5 wt% of Fe, and between 0.05 and less than 0.6 wt% of Mn, and one or more members selected from the group consisting of 0.01 to 0.2 wt% of Cr, 0.01 to 0.2 wt% of Ti, 0.01 to 0.2 wt% of Zr, and 0.01 to 0.2 wt% of V, with the balance of aluminum and unavoidable impurities, wherein the aluminum sheet material[, after] is obtained by the method comprising:

melting the aluminum alloy;

casting the aluminum alloy;

homogenizing the aluminum alloy;

hot-rolling the aluminum alloy;

cold-rolling the aluminum alloy;

annealing[, is subject to] the aluminum alloy; and

cooling the aluminum alloy at 3°C/sec or [more] above,

thereby obtaining the aluminum sheet material for automobiles,

and wherein a percent reduction is 98% or above in the production of the aluminum sheet material for automobiles.

Claim 9 has been added.

PATENT
0234-0433P

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicant: Kazuhisa KASHIWAZAKI et al. Conf.: 4184

Appl. No.: 09/978,063 Group: 1742

Filed: October 17, 2001 Examiner: COMBS, JANELL

For: ALUMINUM SHEET MATERIAL FOR AUTOMOBILE AND METHOD OF PRODUCING THE SAME

TERMINAL DISCLAIMER TRANSMITTAL

Assistant Commissioner for Patents
Washington, DC 20231

March 19, 2003

Sir:

Attached hereto is an executed Terminal Disclaimer in connection with the above-identified application.

The appropriate fee of $110.00 (large entity) is also attached hereto.

Please charge any fees or credit any overpayment pursuant to 37 C.F.R. § 1.20 to Deposit Account No. 02-2448.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By _____ #36,623
Marc S. Weiner, #32,181

MSW/TBS/crt
0234-0433P

P.O. Box 747
Falls Church, VA 22040-0747
(703) 205-8000

(Rev. 01/02/02)